

# NEWEST SCIENTIFIC DISCOVERIES & REMARKABLE FACTS

## THE CARRIER PIGEON'S IMPORTANCE IN WAR



A VANLOAD OF CARRIER PIGEONS FOR USE IN THE FRENCH ARMY.



A PHOTOGRAPH TAKEN BY A PIGEON FOR MILITARY PURPOSES: A VIEW SHOWING A BRIDGE.

THE FEATHERED PHOTOGRAPHER: DOUBLE CAMERA ATTACHED TO A PIGEON.



A BIG EUROPEAN PIGEON FLYING CONTEST.



A SINGLE CAMERA THAT CAN BE CARRIED BY A BIRD.



A DISPATCH TUBESLIP OVER THE TAIL FEATHER.

THOUGH wireless telegraphy and aeroplanes may have lessened the importance of pigeons as dispatch-bearers in times of war, they have by no means ousted them. Only recently two pigeon-dealers, one of them a German, were arrested in London for having in their possession sixty "carrier and other pigeons" in contravention of the Aliens' Restrictions Act; and about the same time a German spy was arrested in Belgium with pigeons in his possession under suspicious circumstances. He was found ostensibly fishing by the banks of the Meuse, and sitting on a basket. When asked what luck he had, he replied, "None, the beggars won't bite." Just then, unfortunately for him, unmistakable sounds of "cooing" came from the basket. What happened to him may easily be imagined. The pigeons are said to have been "fairly tender!"

That these aerial messengers are still capable of rendering valuable service, chiefly between forts, is shown by the fact that in Germany there are about 300,000 of these "homing pigeons" belonging to various societies, and at this number about 8,000 are reserved exclusively for government use. French statistics show that something like 15,000 of these birds are kept well trained for military service.

During the Franco-German War of 1870-71 these pigeons played a very important part. At first they carried dispatches reduced by photography to microscopic proportions on thin sheets of paper. Later, all matter, whether public dispatches or letters, was printed in ordi-

ary type, transferred and reduced by micro-photography to thin films of collodion measuring about two inches by one.

These were so light that thousands of dispatches, weighing less than one gramme, could be carried by one pigeon. The films were rolled up and placed in a quill, which was then fastened lengthwise to one of the tail feathers. Arriving in Paris, the film was flattened out, and the printed matter was thrown on a screen by a lantern and copied. Later, sensitive paper replaced the screen, so that the labor of copying was saved. The cost of sending messages was high, as may be judged from the fact that the

postal fees on a single dispatch would often amount to more than £10,000. Each dispatch was repeated, sometimes twenty or thirty times, till acknowledged by balloon-post, which brought back the birds for another journey. The Germans spared no effort to frustrate these sources

of information. Krupp made special guns to bring down the balloons, and the pigeons were harassed by trained falcons. A miniature camera is in existence which can be attached to the body of a pigeon, carried by the bird to a considerable height above fortified and other

positions, and used to photograph the positions. The possibilities of its use in war were recognized in Germany before the present conflict, and experiments made. The camera is, of course, automatic in its action, and takes photographs at regular intervals. The apparatus is made in two forms, as a single camera and as a double camera.

The term "carrier pigeons" for these birds is now a misnomer; for the "carrier" pigeon is a bird of a different type, distinguished by the enormous development of the "wattles" round the eyes and beak. The true "carrier" pigeon is now more correctly known as the homing-pigeon, homer, or Antwerp carrier. The latter name indicates the origin of the breed; for the Belgians are without rivals for their admiration for this bird and their skill in training it. The homer is, even in his native land, represented by several races, all of which, however, possess the "homing" instinct. These races, "Les Pigeons Voyageurs," are bred first and foremost for their powers of flight; color and marking are of no account. Where these factors have been taken into consideration for the ends of the "show-bench," the flying qualities have invariably been lost. Some of the finest performers belong to the race known as "Smurles" or Liege pigeons. They are rather small, and look as though bred originally from a somewhat coarse "Blue Owl" and a "Blue-rock." The enthusiasm displayed by the Belgians for the sport of pigeon-flying is shown by the fact that now-a-days millions are annually sent over the French border to be raced back to Belgium. Nearly every village has its "Societe Colombophile." The sport began in 1818 with a match of 600 miles. In 1823 the first race from London to Belgium was flown. The annual "Concours National"—a race of 500

miles, from Toulouse to Brussels—was inaugurated in 1831, in which year the first races in Great Britain, from Exeter, Plymouth, and Penzance to London, took place.

The speed of the earlier birds averaged 1,250 yards a minute, but today this has been increased to 1,836 yards a minute. The speed, of course, depends much on the state of the weather. In a race between Montargis and Brussels, in 1876, in bright, clear weather, all the prize-winners made the journey of 270 miles in three hours and a quarter. Over the same course in 1877 in thick, stormy weather, thirty hours elapsed before the first bird arrived.

That the homing pigeon possesses an extraordinarily acute sense of direction, there can be no question. A case is on record of a bird bought in Brussels and brought over to England, where it remained in close confinement for several months. Then, one fine day, it was liberated for exercise. It at once made off, and in a few hours was back in its loft in Brussels, having traveled over 400 miles of country which it had never seen before. As a rule, however, these birds are carefully trained, the initial stages beginning at the age of about four months. By the end of the first year, a flight of one hundred miles can be successfully performed. But longer flights are performed only by fully matured birds of at least three years old. It is a mistake, however, to suppose, as some do, that they will fly at night, or in a fog. They must always have a clear view. As to whether the memory or "instinct" is the guiding factor in these journeys, must be left to another occasion.

## SOME Common MILITARY Terms EXPLAINED

MILITARY terms and titles convey but little to the ordinary man in the street. He is frequently unable to tell the difference between a column and a troop, or a battalion and a division. A glossary of such technical names will make it easier to understand the war intelligence which at present fills our newspapers. It has to be borne in mind, however, that the compositions of the armies of two nations are not necessarily alike, though generally they do not differ to any great extent. In compiling the following explanatory table, the British army is taken as a model.

Company—Is one-eighth of an infantry battalion commanded by a captain.

Concentration—The bringing of

troops to bear upon one point or center.

Squadron—Is composed of two cavalry troops, and is a maneuvering unit.

Flanking Movement—A maneuver by which the side of an army is threatened or attacked.

Battalion—The soldier-groom of a mounted officer. On active service he takes his place in the ranks.

Pontoon—Buoyant vessels used in military operations for supporting a temporary bridge across a river.

Dragoon—A cavalry soldier who is armed with an infantry firearm and trained to fight on foot as well as on horseback.

Commissariat—Is the system where by armies are provided with food, forage, fuel, quarters, and all other necessities, except warlike stores.

Battery—A group of guns (generally six), whether field or siege, under the command of a major. The term includes also the wagons, horses, men, and all the equipment.

Regiment—Consists either of four squadrons of cavalry, some six or seven batteries of artillery, or three or four battalions of infantry. A cavalry regiment has a strength of 666 men.

Troop—Is the half of a cavalry squadron, and is composed of a captain, two lieutenants, fifty-six mounted non-commissioned officers and troopers, and some twenty dismounted men.

Staff—A body of skilled officers whose duty it is, under orders from the commanding officers of various grades, to arrange the movements and supply of the various units of an army.

Brigade—Consists of four battalions and is commanded by a brigadier-general. There are three regiments of cavalry in all cavalry brigades. An artillery brigade consists of three batteries.

Division—Is the smallest unit which contains all branches of the service. A small army in itself, under a general officer and capable of acting independently; its strength is variable, but is

generally close upon 10,000 men with some 300 officers.

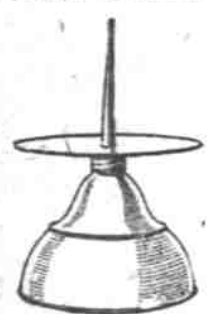
Column—Is a military formation several ranks in depth and of any length of front, adopted for the convenience of movement. A thin single-rank formation is now universal for the leading troops in battle, but the supports move in column until obliged by hostile fire to deploy into line.

Battalion—An infantry unit of 1,098 men (1,000 bayonets). Its front in two-deep line or in modern-attack formation is 340 yards. Is grouped for tactical purposes into two half-battalions, each commanded by a major, the whole being under the command of a lieutenant-colonel.

Mobilization—Means making an army ready for taking the field. The various units are brought to war strength by calling in reserve men, in organizing the staff of brigades, divisions, and army corps, constituting the commissariat, medical and transport services, and in accumulating provisions and munitions.

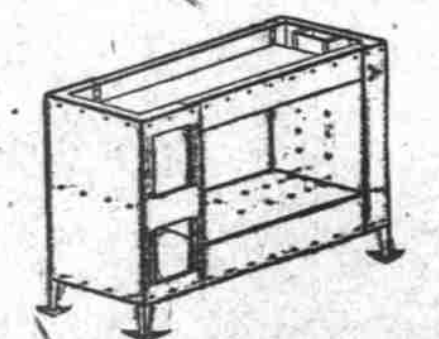
## CAN Saves OIL!

HERE is a novel and easy way to keep oil from spilling from an oil can when it is accidentally upset. Solder a disc of metal, which should be a little bigger than the base of the can, on the upper surface of the base of the spout. If the can is upset this will keep the oil from running out. This will prevent waste in a machine shop and keep cloth from being soiled should the housewife upset the can while oiling the sewing machine.



## Here's TAKE DOWN Stove

A TAKE DOWN cook range has been invented by G. N. Fraser, of Eugene, Ore. It is made especially for campers. It consists of four sections—fire-



box, fire, which is opposite to and facing the firebox, and intermediate upper and lower sections. All these sections are easily taken apart, and occupy a very small space in shipping or storing.

## DOUBLE-PISTON Internal Combustion ENGINE

THE idea of the double-piston engine is not new. It dates back to Bodmer, who in 1834 invented a steam engine with two pistons that operated toward and from each other in a single cylinder. The principal drawback to this construction was found to lie in the stuffing boxes. However, this drawback does not apply to the single-acting internal-combustion engine, and we find in the accompanying illustration an engine of this type with two cylinders, each filled with double pistons, says the Scientific American. The advantages claimed for this novel engine are that it obviates certain difficulties of heat radiation common to the ordinary internal combustion engine, that the weight per horse power is decreased and that it does away with useless forces and negative work.

For the purposes of identification we have lettered the pistons in the nearer cylinder A and B respectively, and the pistons in the farther cylinder C and D. The piston A is fitted with a crosshead from which a pair of rods run down obliquely to a pair of crossheads carried by the piston D. In like manner pistons B and C are connected by a pair of oblique rods. The engine is of the two-cycle type. In the position illustrated the explosive mixture is entering the farther cylinder through an intake port that has just been uncovered by the piston C and is displacing the products of combustion which pour out of the exhaust port that has been uncovered by the piston D. In the meantime the charge in the adjoining cylinder has been compressed, and on ignition it will force the pistons A and B apart. The piston B acts directly on the crankshaft, while the piston A also acts on the crankshaft, but through its connection with piston D. As the pistons

A and B move apart, the pistons C and D are pulled together by the rod connections, compressing the charge between them.

The chief mechanical drawback to



this construction lies in the obliquity of the connecting rods which produces a horizontal thrust on the crosshead slides. However, the thrust of the two

sets of rods is equal and opposite, preserving a balance that prevents vibration. One of the principal mechanical advantages of the construction lies in the fact that the work of compressing the charge is not performed through the crank and connecting rod, but directly through the engine rods, and only useful work is transmitted to the crankshaft. The center of gravity of pistons A and D travels vertically in the plane Q P, while the center of gravity of the other pair travels in identically the same plane, but in the opposite direction, so that the two motions are perfectly balanced.

The advantages of this engine from the point of view of heat are quite obvious. The cylinders consist of two water-jacketed tubes open at each end. As there are no cylinder heads, each tube is free to expand symmetrically, and as there are no corners or pockets the mean temperature of the inner surface of the cylinders is very low.

In a new construction of this engine, wherein eight two-stroke pistons are combined with four cranks, the weight for a given power is from one-half to one-third of that required in other constructions. A 500-horse power engine of this type was recently put to a test. It weighed, without flywheel, under twenty tons and gave some 550-horse power continuously. An ordinary gas engine of equal power would weigh twice as much. The result was obtained with four cylinders, 12 inches in diameter, at a modern piston speed of 750 feet per minute, and a low mean effective pressure of under 70 pounds per square inch. Despite the makeshift character of the auxiliaries for supplying the engine with air and gas, it showed an overall efficiency during a thirty-hour test of just under 30 per cent, while the indicated efficiency was 37.6 per cent. The mechanical efficiency of the engine itself was about 90 per cent.

## LAST of WILD PIGEONS Dies

NEWS of the death in Cincinnati of Martha, the last wild pigeon in the world, according to all ornithological records, was conveyed recently to P. Gilbert Pearson, general executive officer of the National Audubon Societies, in a telegram from Eugene Swope, the Ohio agent of the societies at Cincinnati. The death of Martha, according to Mr. Pearson, is a calamity of as great importance in the eyes of naturalists as the

death of a Kaiser to Germans throughout the world.

Martha had been in poor health for several years in her cage at the Zoological Garden in Cincinnati. Many efforts had been made to find a mate for her, or to discover some other specimen of the wild pigeon, but they were without avail. According to all ornithological data available, Martha was the last of her tribe in the world.

Members of the National Audubon Societies some time ago offered a prize of \$1,500 to any one who could find a wild pigeon nest. All that was necessary was to find the nest, telegraph to C. F. Hodge, a naturalist of Clark University, and to await the findings of ornithologists whom he would immediately dispatch to the scene to investigate the genuineness of the find. The Audubon Societies received on an average 100 false alarms a year, but in not a single case was the nest reported found to be a wild pigeon's. Instead almost every such nest was found to be that of an ordinary turtle dove. The wild pigeon resembles the ordinary wild dove, but is considerably larger.

The extinction of the wild pigeon tribe was the more amazing because of the vast extent to which it had flourished in this country prior to 1895. Wild passenger pigeons used to travel over the country by millions. Audubon himself told of their roosting in certain parts of Kentucky in territory covering a space three miles long, which was almost literally blotted by them. Hundreds of farmers, he tells, used to camp on the outside of the vast roosting pigeon host and shoot them by the thousands from the edge of their roosting place. The birds were fed by thousands to the farmers' hogs after each night's killing.

The slaughter raged for years with nets, traps, and guns, and by 1894 there were very few of the wild pigeons seen in the country. Several years ago they had dwindled down to a few specimens left in captivity in Milwaukee and in the Cincinnati Zoo. Martha's mate died about four years ago, and though a prize of \$1,000 was offered for any one who could find another bird to take its place, Martha remained in solitary widowhood until she died.

Martha herself was hatched in captivity in the Cincinnati Zoo. At the time of her death she was twenty-nine years old. Her last illness had been a matter of concern to ornithologists the world over, and the Cincinnati agent of the Audubon Societies had been instructed to communicate at once with leading ornithologists and naturalists of the country as soon as she died.

## COMPOSITION of an ARMY

MANY points in the war dispatches now being received in this country are far from intelligible because of the lack of information in regard to the way European armies are organized and the number of men in the various units spoken of. This subject is cleared up in the Scientific American, which explains the structure of foreign regiments and the number of men in each subdivision.

The numerical strength of the various units which compose a European army in the field differs so widely from that of our own army, that it is difficult for the average American to understand, in reading the European war dispatches, what number of troops is represented by the terms brigade, division, regiment, army corps, etc. The following statement is applicable, broadly, to all of the

continental armies engaged in the present conflict.

The European regiment in full war strength numbers about 3,200 men, under the command of a colonel. Three regiments form a brigade of 10,000 men, commanded by a major general. Two brigades form a division of 20,000 men, under the command of a lieutenant general. Two divisions constitute an army corps of 40,000 men, commanded by a general, and three army corps form an independent field army (fully equipped with cavalry, artillery, commissary, engineers and medical department) of a total strength of 120,000 men. There are variations from these totals as given, but they are not great, and the above estimate of the strength of the various units if applied to the number of divisions, brigades, army corps, etc., mentioned in the dispatches will give a closely accurate estimate of the number of troops engaged.